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| 10/817,438 | 04/05/2004 | Akito Sato | Q80942 | 1293 |

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| ART UNIT | PAPER NUMBER |
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DATE MAILED: 08/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/817,438 | SATO ET AL. | |
| | Examiner | Art Unit | |
| | Brian Goldberg | 2861 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *21 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-4,6-9,11,12,17 and 18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-9,11,12,17 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 August 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Objections*

1. Claims 9 and 18 objected to because of the following informalities:

2. Regarding claim 9, the limitation "wherein each of all the nozzles making up said first nozzle row and each of all the nozzles making up said second nozzle row are arranged such that they are misaligned in a sub-scanning direction by a fixed distance" does not make sense in that each nozzle in any vertical row of nozzles is misaligned in a sub-scanning direction (where the scanning direction is horizontal and perpendicular to the vertical row and the sub-scanning direction is aligned with and parallel to the vertical row). This claim language does not seem to define the applicant's invention as intended. Appropriate correction is required.

3. Regarding claim 18, the limitation "each of all the nozzles making up said second nozzle row is in a same position in a sub-scanning direction as one of the nozzles making up said first nozzle row" is not clear. A suggested correction is to change the limitation to "each of all the nozzles making up said second nozzle row is aligned in a sub-scanning direction with one of the nozzles making up said first nozzle row."

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 8, and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Oikawa (US 6371609).

3. Regarding claim 1, Oikawa discloses "a print head (20a of Fig 3A) having a plurality of nozzles for ejecting ink to form dots (30a,b of Fig 3A), wherein said print head has a first nozzle row ejecting ink having color material (30b of Fig 3A) and a second nozzle row for ejecting ink not having color material (30a of Fig 3A); wherein a number per unit area of droplets of said ink not having color material (53a,b of Fig 5), which are discharged by said second nozzle row, is less than a number per unit area of droplets of said ink having color material (52 of Fig 5), which are discharged by said first nozzle row; wherein the nozzles making up said first and said second nozzle rows are arranged with a predetermined spacing between adjacent nozzles in a sub-scanning direction (p of Fig 1); and wherein scanning is carried out by partially overlapping scanning paths of said print head such that a gap created due to said spacing in said sub-scanning direction is filled in (see print area 5 of Fig 1 in which no gap "p" exists)."

4. Regarding claim 2, Oikawa discloses "wherein a number of said droplets of said ink not having color material (53a,b of Fig 5), which are discharged by said second nozzle row (30a of Fig 3A), per unit length in a main scanning direction is less than a number of said droplets of said ink having color material (52 of Fig 5), which are discharged by said first nozzle row (30b of Fig 3A), per unit length in the main scanning direction (direction indicated by "scan" arrow in Fig 5)."

5. Regarding claim 3, Oikawa discloses "wherein a number of said droplets of said ink not having color material (4b of Fig 1), which are discharged by said second nozzle row (1b of Fig 1), per unit length in a sub-scanning direction is less than a number of said droplets of said ink having color material (4a of Fig 1), which are discharged by said first nozzle row (1a of Fig 1), per unit length in the sub-scanning direction (the number of non color material drops per unit length in both the scanning and sub-scanning direction is less than the number of color material drops per unit length)."

6. Regarding claim 8, Oikawa discloses "wherein said ink not having color material includes a component for preventing bleeding of said ink having color material (col 1 ln 34-38); and dots of said ink not having color material are formed at an area where a density of dots of said ink having color material is high in accordance with that density (see Fig 1 and 5 where the density of dots of ink having color is high)."

7. Regarding claim 11, Oikawa discloses "a step of discharging droplets of said ink having color material using said first nozzle row (30b of Fig 3A, 52 of Fig 5); and a step of discharging droplets of said ink not having color material using said second nozzle row (30a of Fig 3A, 53a,b of Fig 5); wherein a number per unit area of said droplets of said ink not having color material (53a,b of Fig 5), which are discharged by said second nozzle row is less than a number per unit area of said droplets of said ink having color material (52 of Fig 5), which are discharged by said first nozzle row; wherein the nozzles making up said first and said second nozzle rows are arranged with a predetermined spacing between adjacent nozzles (p of Fig 1); and scanning is carried

out by partially overlapping scanning paths of said print head such that a gap created due to said spacing is filled in (see print area 5 of Fig 1 in which no gap "p" exists)."

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa in view of Kitakami (US 6601945).

10. Regarding claim 4, Oikawa discloses the claimed invention as set forth above with respect to claim 1. Thus Oikawa meets the claimed invention except "wherein a number of nozzles making up said second nozzle row is less than a number of nozzles making up said first nozzle row."

11. Kitakami teaches "wherein a number of nozzles making up said second nozzle row is less than a number of nozzles making up said first nozzle row (Fig 6A and 6B, wherein there are 240 color ink nozzles and 16 non-color ink nozzles)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the number of nozzles ejecting non-color ink be less than the number of nozzles ejecting color ink. One would have been motivated to so modify Oikawa for the benefit of reducing the total number of nozzles making the head smaller, while also conserving the non-color ink, which makes the printing apparatus more efficient.

12. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa in view of Kitakami and further in view of Takekoshi et al. (US 6960259). Oikawa discloses the claimed invention as set forth above with respect to claim 1. Thus Oikawa meets the claimed invention except "said ink having color material is a pigment-based ink; and said ink not having color material includes a component for increasing degree of luster."

13. Kitakami teaches "said ink having color material is a pigment-based ink (col 14 ln 25-27)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to use a pigment-based ink. One would have been motivated to so modify Oikawa by using pigment ink for the benefit of improving the water resistance of the ink, which is a known property of pigment ink.

14. Takekoshi et al. teach "said ink not having color material includes a component for increasing degree of luster (col 1 ln 13-18)." Takekoshi et al. teach applying a non-color ink to improve glossiness or luster. It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the non-color ink increase the degree of luster. One would have been motivated to so modify Oikawa in view of Kitakami for the benefit of reducing the fading of the colors and increasing weatherability as stated by Takekoshi et al.

15. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa in view of Chen et al. (US 6953244). Oikawa discloses the claimed invention as set forth above with respect to claim 1. Thus Oikawa meets the claimed invention except

"wherein dots of said ink not having color material are formed at an area where a density of dots of said ink having color material is low in accordance with that density."

16. Chen et al. teach "wherein dots of said ink not having color material are formed at an area where a density of dots of said ink having color material is low in accordance with that density (see abstract, in which non-color ink is applied in a non-image area)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have non-color ink dots formed where a density of color ink dots is low. One would have been motivated to so modify Oikawa for the benefit of reducing the differential in ink density as stated by Chen et al.

17. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa in view of Tajika et al. (US 6120141).

18. Regarding claim 9, Oikawa disclose "a print head (20a of Fig 3A) having a plurality of nozzles for ejecting ink to form dots (30a,b of Fig 3A), wherein said print head has a first nozzle row ejecting ink having color material (30b of Fig 3A) and a second nozzle row for ejecting ink not having color material (30a of Fig 3A); wherein a number per unit area of droplets of said ink not having color material (53a,b of Fig 5), which are discharged by said second nozzle row, is less than a number per unit area of droplets of said ink having color material (52 of Fig 5), which are discharged by said first nozzle row." Thus Oikawa meets the claimed invention except "wherein each of all the nozzles making up said first nozzle row and each of all the nozzles making up said second nozzle row are arranged such that they are misaligned in a sub-scanning direction by a fixed distance."

19. Tajika et al. teaches "wherein each of all the nozzles making up said first nozzle row and each of all the nozzles making up said second nozzle row are arranged such that they are misaligned in a sub-scanning direction by a fixed distance (see Fig 21 in which due to the alignment in vertical rows as discussed in the claim objections, they are misaligned in a sub-scanning direction)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the non-color ink misaligned in the sub-scanning from the color ink. One would have been motivated to so modify Oikawa for the benefit of performing image printing that will not appear to have uneven density, as stated by Kitakami in column 7, lines 26-31, which improves the image quality.

20. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa in view of Kitakami and further in view of Tajika et al.

21. Regarding claim 12, Oikawa discloses "a first nozzle row for ejecting ink having color material (30 b of Fig 3A); and a second nozzle row for ejecting ink not having color material (30a of Fig 3A)." Thus Oikawa meets the claimed invention except "wherein a number of nozzles making up said second nozzle row is less than a number of nozzles making up said first nozzle row; and wherein each of all the nozzles making up said first nozzle row and each of all the nozzles making up said second nozzle row are arranged such that they are misaligned in a sub-scanning direction by a fixed distance."

22. Kitakami teaches "wherein a number of nozzles making up said second nozzle row is less than a number of nozzles making up said first nozzle row (Fig 6A and 6B, wherein there are 240 color ink nozzles and 16 non-color ink nozzles)." It would have

been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the number of nozzles ejecting non-color ink be less than the number of nozzles ejecting color ink. One would have been motivated to so modify Oikawa for the benefit of reducing the total number of nozzles making the head smaller, while also conserving the non-color ink, which makes the printing apparatus more efficient.

23. Tajika et al. teaches "wherein each of all the nozzles making up said first nozzle row and each of all the nozzles making up said second nozzle row are arranged such that they are misaligned in a sub-scanning direction by a fixed distance (see Fig 21 in which due to the alignment in vertical rows as discussed in the claim objections, they are misaligned in a sub-scanning direction)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the non-color ink misaligned in the sub-scanning from the color ink. One would have been motivated to so modify Oikawa for the benefit of performing image printing that will not appear to have uneven density, as stated by Kitakami in column 7, lines 26-31, which improves the image quality.

24. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa in view of Shibata et al. (US 6779865).

25. Regarding claim 9, Oikawa disclose "a print head (20a of Fig 3A) having a plurality of nozzles for ejecting ink to form dots (30a,b of Fig 3A), wherein said print head has a first nozzle row ejecting ink having color material (30b of Fig 3A) and a second nozzle row for ejecting ink not having color material (30a of Fig 3A); wherein a number per unit area of droplets of said ink not having color material (53a,b of Fig 5),

which are discharged by said second nozzle row, is less than a number per unit area of droplets of said ink having color material (52 of Fig 5), which are discharged by said first nozzle row." Thus Oikawa meets the claimed invention except "wherein each of all the nozzles making up said first nozzle row and each of all the nozzles making up said second nozzle row are arranged such that they are misaligned in a sub-scanning direction by a fixed distance."

26. Shibata et al. teaches "wherein each of all the nozzles making up said first nozzle row and each of all the nozzles making up said second nozzle row are arranged such that they are misaligned in a sub-scanning direction by a fixed distance (see Fig 2 in which the nozzle row on the right of 21-2 is misaligned with the nozzle row on the left of 21-3 and col 4 ln 62 – col 5 ln 2)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the non-color ink misaligned in the sub-scanning from the color ink. One would have been motivated to so modify Oikawa for the benefit of performing image printing that will not appear to have uneven density, as stated by Kitakami in column 7, lines 26-31, which improves the image quality.

27. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa in view of Kitakami and further in view of Shibata et al.

28. Regarding claim 12, Oikawa discloses "a first nozzle row for ejecting ink having color material (30 b of Fig 3A); and a second nozzle row for ejecting ink not having color material (30a of Fig 3A)." Thus Oikawa meets the claimed invention except "wherein a number of nozzles making up said second nozzle row is less than a number of nozzles making up said first nozzle row; and wherein each of all the nozzles making up said first

nozzle row and each of all the nozzles making up said second nozzle row are arranged such that they are misaligned in a sub-scanning direction by a fixed distance."

29. Kitakami teaches "wherein a number of nozzles making up said second nozzle row is less than a number of nozzles making up said first nozzle row (Fig 6A and 6B, wherein there are 240 color ink nozzles and 16 non-color ink nozzles)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the number of nozzles ejecting non-color ink be less than the number of nozzles ejecting color ink. One would have been motivated to so modify Oikawa for the benefit of reducing the total number of nozzles making the head smaller, while also conserving the non-color ink, which makes the printing apparatus more efficient.

30. Shibata et al. teaches "wherein each of all the nozzles making up said first nozzle row and each of all the nozzles making up said second nozzle row are arranged such that they are misaligned in a sub-scanning direction by a fixed distance (see Fig 2 in which the nozzle row on the right of 21-2 is misaligned with the nozzle row on the left of 21-3 and col 4 ln 62 – col 5 ln 2)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the non-color ink misaligned in the sub-scanning from the color ink. One would have been motivated to so modify Oikawa for the benefit of performing image printing that will not appear to have uneven density, as stated by Kitakami in column 7, lines 26-31, which improves the image quality.

31. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa in view of Kanda et al. (US 6471322).

32. Regarding claim 17, Oikawa discloses "a print head (20a of Fig 3A) having a plurality of nozzles for ejecting ink to form dots (30a,b of Fig 3A), wherein said print head has a first nozzle row ejecting ink having color material (30b of Fig 3A) and a second nozzle row for ejecting ink not having color material (30a of Fig 3A); wherein a number per unit area of droplets of said ink not having color material (53a,b of Fig 5), which are discharged by said second nozzle row, is less than a number per unit area of droplets of said ink having color material (52 of Fig 5), which are discharged by said first nozzle row." Thus Oikawa meets the claimed invention except "wherein each of all of the nozzles making up said second nozzle row is arranged such that all the nozzles making up said second nozzle row are arranged at a constant pitch, and said constant pitch is larger than a pitch at which the nozzles making up said first nozzle row are arranged."

33. Kanda et al. teaches "wherein each of all of the nozzles making up said second nozzle row is arranged such that all the nozzles making up said second nozzle row are arranged at a constant pitch (see first recording head of Fig 4), and said constant pitch is larger than a pitch at which the nozzles making up said first nozzle row are arranged (see Fig 4 and Fig 5, with first nozzle row pitch of 1/1200 inches and second nozzle row pitch of 1/600 inches)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to have the constant nozzle pitch of the second row be greater than the constant pitch of the first row. One would have been motivated to so modify Oikawa for the benefit of being able to record at high resolution without reducing recording speed as stated by Kanda et al.

34. Regarding claim 18, Oikawa discloses "a print head (20a of Fig 3A) having a plurality of nozzles for ejecting ink to form dots (30a,b of Fig 3A), wherein said print head has a first nozzle row ejecting ink having color material (30b of Fig 3A) and a second nozzle row for ejecting ink not having color material (30a of Fig 3A); wherein a number per unit area of droplets of said ink not having color material (53a,b of Fig 5), which are discharged by said second nozzle row, is less than a number per unit area of droplets of said ink having color material (52 of Fig 5), which are discharged by said first nozzle row." Thus Oikawa meets the claimed invention except "wherein each of all of the nozzles making up said second nozzle row is arranged such that each of all the nozzles making up said second nozzle row is in a same position in a sub-scanning direction as one of the nozzles making up said first nozzle row, and a spacing between adjacent nozzles making up said second nozzle row is larger than a spacing between adjacent nozzles making up said first nozzle row."

35. Kanda et al. teaches "wherein each of all of the nozzles making up said second nozzle row is arranged such that each of all the nozzles making up said second nozzle row is in a same position in a sub-scanning direction as one of the nozzles making up said first nozzle row (see Fig 5 in which all of the nozzles in the second nozzle row for ink not having color material (black) are aligned in a sub-scanning direction with all of the nozzle in the first nozzle row), and a spacing between adjacent nozzles making up said second nozzle row is larger than a spacing between adjacent nozzles making up said first nozzle row (see Fig 5 with first nozzle row spacing of 1/1200 inches and second nozzle row spacing of 1/600 inches)." It would have been obvious to one of

ordinary skill in the art at the time of the applicant's invention to have the nozzle spacing of the second row be greater than the spacing of the first row with the nozzles of the second row aligned in a sub-scanning direction with nozzles of the first row. One would have been motivated to so modify Oikawa for the benefit of being able to record at high resolution without reducing recording speed as stated by Kanda et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Goldberg whose telephone number is 571-272-2728. The examiner can normally be reached on Monday through Friday, 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vip Patel can be reached on 571-272-2458. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**Brian Goldberg**
**AU 2861**
**August 28, 2006**

**Vip Patel**
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